BASEWIDE ENERGY SYSTEMS PLAN
FOR
FORT STEWART, GEORGIA

FINAL REPORT
EXECUTIVE SUMMARY
INCREMENTS A, B, C, D, E, F, AND G

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Army Contract No. DACA21-80-C-0014
JRB Contract No. 2-815-04-225

July 1985

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EXECUTIVE SUMMARY

1. INTRODUCTION

This report presents the results of Increments A, B, C, D, E, F, and G of the Energy Engineering Analysis Program conducted at Fort Stewart, Georgia, by JRB Associates under Contract No. DACA21-80-C-0014. This report includes analyses of the energy patterns at the facility, and the identification and evaluation of energy conservation opportunities. The results obtained indicate that, although energy use at Fort Stewart can rise to 80.4 percent over FY 1975 figures, implementation of all EEAP projects will keep this increase down to a 37.5 percent increase. This reduction can be achieved even though the total square feet of heated space is projected to increase by 58 percent. These reports are organized into 6 volumes, plus appendices.

2. EXISTING ENERGY USE

Electricity, natural gas, fuel oil, and propane are the main energy sources at Fort Stewart. In FY 1975 the total energy use at the Post was 1,159,500 MBtu. A summary of the FY 1983 basewide energy use by fuel type is given in Table 1, which shows that electricity currently accounts for approximately 52 percent of total energy use. Total energy use at the Post for the years 1977 to 1983 is shown in Table 2.

Early work in this study emphasized energy use in buildings. Initial data for the study were gathered through a series of site visits during which buildings were inventoried, patterns of building energy use were identified, and typical buildings were selected for detailed study in each category. Energy use data was analyzed to determine how much energy the various types of buildings use and their functional energy use. Since this effort took place in 1980, FY 1979 energy use data was the basis of the analysis. Figures 1, 2, 3, and 4 provide a summary of the building inventory and energy use in FY 1979. The energy profiles in these figures were developed by evaluating the energy use of typical buildings and expanding those values to represent the entire Post.

TABLE 1. ENERGY USE AT FORT STEWART - FY 1983

ENERGY SOURCE	PURCHASED ENERGY	SOURCE USE
Electricity	116,980,690 kWh	1,356,976 MBtu
No. 2 Fuel Oil	863,180 gallons	119,723 MBtu
No. 5 Fuel Oil	2,414,316 gallons	361,399 MBtu
Natural Gas	1,933 therms	193,311 MBtu
Propane	249,152 gallons	23,794 MBtu

TABLE 2. ANNUAL ENERGY USE AT FORT STEWART*- FY 1979 - 1983 (MBtu)

ENERGY SOURCE	FY 1977	FY 1978	FY 1979	FY 1980	FY 1981	FY 1982	FY 1983
Electricity	655,300	888,300	963,300	1,051,102	1,150,624	1,206,638	1,356,976
No. 2 Fuel Oil	143,300	122,200	81,900	42,801	62,283	223,725	119,723
No. 5 Fuel Oil	91,500	140,700	174,900	264,202	254,405	104,998	361,399
Natural Gas	134,700	231,700	232,600	212,273	205,231	184,722	193,311
Propane	97,000	102,900	63,400	28,884	35,350	37,841	23,794

SOURCE: Facilities Engineers, Fort Stewart, GA, written communication, 3 July, 1984

*1975 total energy use was 1,159.5KMBtu. Energy use by fuel type was not available for 1975.

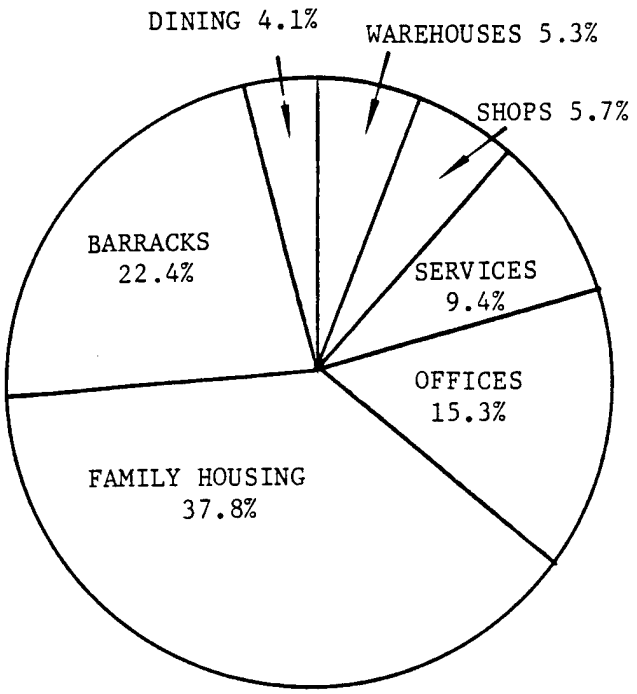

FIGURE 1. FY 1979 FLOOR AREA PROFILE BY BUILDING CATEGORY
SOURCE: Appendix A, Increment A

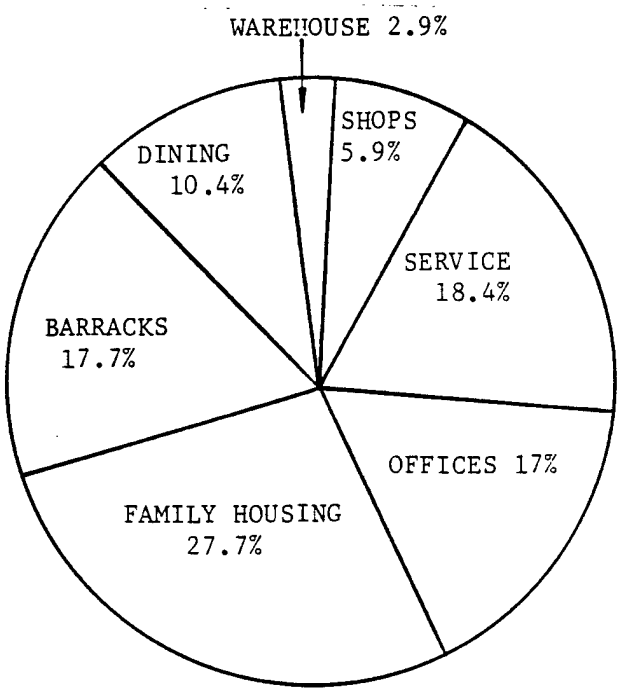

FIGURE 2. FY 1979 ENERGY USE BY BUILDING CATEGORY
SOURCE: Appendix C, Increment A

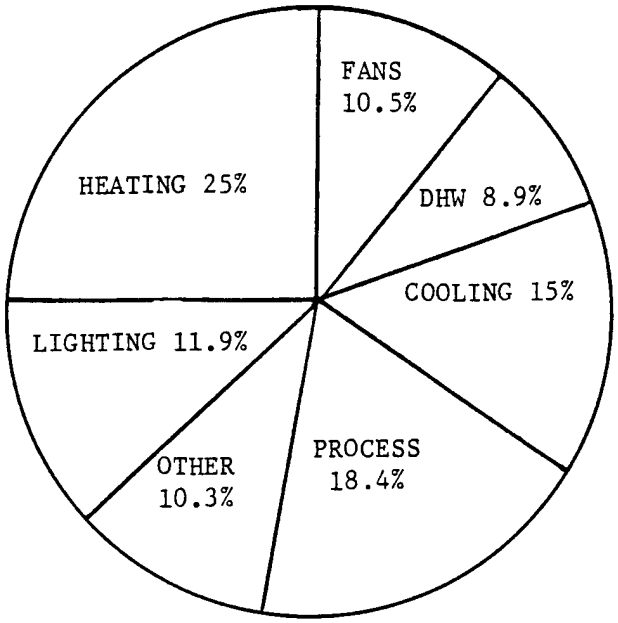

FIGURE 3. FY 1979 ENERGY USE BY BUILDING SYSTEM
SOURCE: Appendix C, Increment A

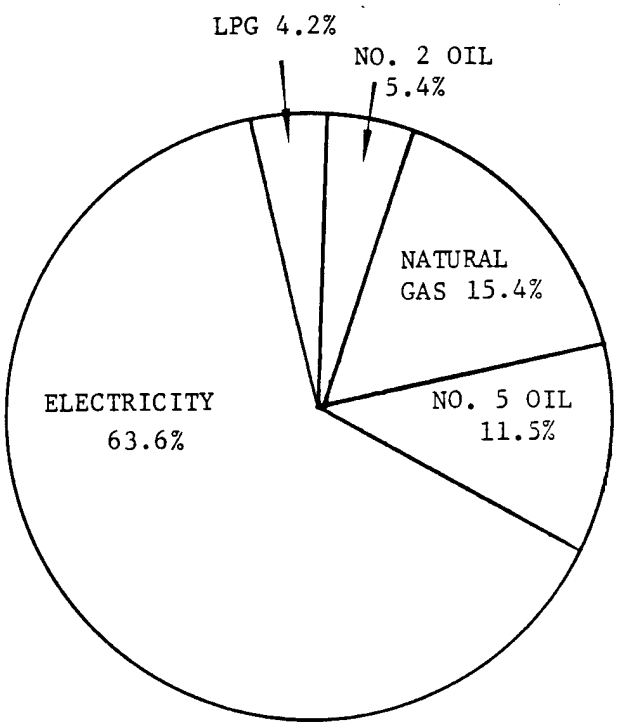

FIGURE 4. FY 1979 ACTUAL ENERGY USE

3. ENERGY CONSERVATION MEASURES DEVELOPED

The energy conservation opportunities at Fort Stewart are summarized in Table 3. This table shows all projects recommended and the resulting economic indices. These energy conservation opportunities were developed by analyzing their applicability to typical buildings. Those that met ECIP criteria were developed into projects with appropriate documentation (DD Forms 1391 and PDB). Table 4 provides a listing of the recommended ECIP projects. Other recommended energy conservation projects identified by JRB are listed in Table 5.

Recommended policy changes for Fort Stewart to improve energy management include:

- Increase level of maintenance activity on energy systems such as the HTHW distribution system and building HVAC controls; and
- Place additional emphasis on energy conservation in EM Barracks.

4. ENERGY AND COST SAVINGS

The total energy savings potential of the recommended energy conservation projects is 248,455 MBtu per year. The represents an estimated energy cost savings of $1.35 million using FY 1985 projected energy costs. The impact on Fort Stewart's total energy use represented by these projects is shown in Table 6.

5. RESULTS OF INCREMENT A - BUILDINGS

The scope of Increment A included an engineering analysis of all existing buildings and processes at Fort Stewart. For each type of building, specific characteristics having a significant effect on energy use were identified. Table 7 shows these characteristics. The energy use of these buildings is identified in that table. Based upon these analyses, energy conservation projects were evaluated using ECIP criteria to determine acceptability. The recommended ECIP projects developed under Increment A are identified in Table 4.

TABLE 3. EEAP CONSERVATION PROJECTS FOR FORT STEWART

INC	PROJECT	PROJECT COST	ENERGY SAVINGS NONRENEW (MBtu)	RENEW (MBtu)	TOTAL (MBtu)	SIR B/C*	E/C	SIMPLE PAYBACK YRS.
E	Central Plant Expansion Using Wood Fuel	($15,180,000)	(45,064)	(-213,840)	(-168,776)	--	(-11.2)	
F	Reduce DHW Temperatures	$25,983	28,646	7,772	36,418	49.6	1,402	<1
G	Relamp w/35 Watt Fluorescent Lamps	$13,988	4,342	--	4,342	23.9*	310	.70
G	Reduce Outside Air	$61,497	5,908	6,804	12,712	21.8*	207	.72
F	Convert To Central Plant Heat	$19,012	2,083	-2,478	-395	11.5	-21	1.70
B	Modify Chilled Water System to Improve Efficiency	$285,711	10,446	20,944	31,390	10.7*	110	1.10
D	Modular Refuse Fired Energy System	($6,671,250)	(28,375)	(281,171)	(309,546)	8.6*	(46)	
A	Install Night Setback Controls - Family Housing	$185,568	11,511	--	11,511	6.8*	62	1.80
A	Reduce Temperature Stratification in High Bay Areas	$200,179	8,855	--	8,855	6.5*	44	3.30
F	Insulate HTHW Pipes	$2,515	91	378	469	5.7	186	2.40
F	Energy Conserving Flour. Lamps (each)	$1.2+	.15+	--	.15+	5.5**	125	1.80
F	Electronic Ballasts (each)	$12+	2+	--	2+	5.0	175	1.70
F	Setback/Timeclocks for HVAC	$13,968	1,876	135	2,011	4.4	144	2.50
G	Replace Incandescent with Fluorescent Lamps	$321,404	22,993	--	22,993	3.2*	72	3.10
F	Reduce Shower Flow Rates	$125,420	1,788	8,904	10,692	3.2	85	6.00
F	Install Fluorescents in Exit Lights	$79,362	8,167	--	8,167	2.9	103	1.30
F	Reduce Infiltration - BOQs	$4,950	108	--	108	2.7	22	8.90
F	Heat Recovery from A/C	$13,026	266	--	266	2.5	20	6.90
A	Install Dimming System for Fluorescent Lighting	$130,353	3,563	--	3,563	2.4*	27	7.20
F	Repair HTHW lines	$116,000	1,048	5,937	6,985	2.3	60	8.20
A	Install Strip Doors For Loading Dock	$102,699	1,769	--	1,769	2.1*	17	11.00
F	High Efficiency Motors (each)	$233+	20+	--	--	1.9	N/A	4.90
A	Replace Existing Safety Security Lighting	$252,279	5,539	--	5,539	1.9*	22	9.00
G	Install Storm Windows - Family Housing	$1,486,690	11,547	3,404	14,951	1.9*	10	10.00
F	Reduce Stratification Heat Losses	$59,919	25	1,770	1,795	1.9	30	11.30
G	Install Flue Gas Dampers on Oil-Fired Furnaces	$195,899	1,204	--	1,204	1.7*	6	7.10
B	Burn Waste Oil in Central Heating Plant	$139,557	8,482	--	8,482	1.5	61	>20
F	Install Timeclock for Exterior Lights	$30,177	1,374	--	1,374	1.4	46	9.30
A	Install Energy Efficient Lighting Systems	$174,206	2,469	--	2,469	1.2*	14	8.40
F	Replace Incandescents with Fluorescent Lamps	$242,245	10,881	--	10,881	1.3	45	5.60
G	Recover Waste Heat at Laundry Plant	$78,014	767	127	894	1.2*	11	15.40
G	Recirculate Toilet Exhaust Air	$613,968	1,323	3,981	5,304	1.2*	9	15.50
A	Replace Existing Exit Lights	$217,241	2,845	--	2,845	1.1*	13	14.90
G	Wall Insulation	$710,002	7,372	116	7,488	1.1*	11	17.20
A	Install Heat Reclaim Units - Family Housing	$1,027,461	19,400	--	19,400	1.1*	19	10.90
A	Install Storm Doors - Family Housing	$211,003	3,189	--	3,189	1.0*	15	11.60
C	Install Solar Hot Water System - Bldg. 405	$67,318	784	--	784	.9*	12	20.00
	TOTALS	$7,207,614	190,662	57,793	248,455		34	

NOTE: Values for the central plant expansion with wood fuel and the refuse fired energy system have not been included in the totals since they are premised on expansion which will occur after FY85.

1. 2-40W bulb fixture at 168 hrs/wk use - Replace at failure
2. 168 hrs/wk operation - Replace at failure
3. Values for 25 hp motor at 50 hrs/wk use - Replace at failure

\+ Values not included in table totals

** NON-energy SIR

TABLE 4. ENERGY CONSERVATION INVESTMENT PROGRAM PROJECTS FOR FORT STEWART

INC	PROJECT	PROJECT COST ($)	NONRENEW (MBTU)	RENEW (MBTU)	TOTAL (MBTU)	SIR B/C*	E/C	SIMPLE PAY BACK YRS.
B	Modify Chilled Water System to Improve Effic.	$285,711	10,446	20,944	31,390	10.7*	110	1.1
A	Install Night Setback Controls - Family Housi	$185,568	11,511	--	11,511	6.8*	62	1.8
A	Reduce Temp. Stratification in High Bay Areas	$200,179	8,855	--	8,855	6.5*	44	3.3
A	Install Dimming System for Fluor. Lighting	$130,353	3,563	--	3,563	2.4*	27	7.2
A	Install Strip Doors For Loading Dock	$102,699	1,769	--	1,769	2.1*	17	11.0
B	Burn Waste Oil in Central Heating Plant	$139,557	8,482	--	8,482	1.9	61	20.0
A	Replace Existing Safety Security Lighting	$252,279	5,539	--	5,539	1.9*	22	9.0
A	Install Energy Efficient Lighting Systems	$174,206	2,469	--	2,469	1.4*	14	13.7
A	Install Heat Reclaim Units - Family Housing	$1,027,461	19,400	--	19,400	1.1*	19	10.9
A	Replace Existing Exit Lights	$217,241	2,845	--	2,845	1.1*	13	14.9
A	Install Storm Doors - Family Housing	$211,003	3,189	--	3,189	1.0*	15	11.6
TOTALS		$2,926,257	78,068	20,944	99,012		34	

TABLE 5. OTHER ENERGY CONSERVATION PROJECTS FOR FORT STEWART

INC	PROJECT	PROJECT COST	ENERGY SAVINGS NONRENEW (MBtu)	RENEW (MBtu)	TOTAL (MBtu)	SIR B/C*	E/C	SIMPLE PAYBACK YRS.
E	Central Plant Expansion Using Wood Fuel	($15,180,000)	(45,064)	(-213,840)	(-168,776)	--	(-11.2)	
F	Reduce DHW Temperatures	$25,983	28,646	7,772	36,418	49.6	1,402	<1
G	Relamp w/35 Watt Fluorescent Lamps	$13,988	4,342	--	4,342	23.9*	310	.70
G	Reduce Outside Air	$61,497	5,908	6,804	12,712	21.8*	207	.72
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D	Modular Refuse Fired Energy System	($6,671,250)	(28,375)	(281,171)	(309,546)	8.6*	(46)	
F	Insulate HTHW Pipes	$2,515	91	378	469	5.7	186	2.40
F	Energy Conserving Flour. Lamps (each)	$1.2+	.15+	--	.15+	5.5**	125	1.80
F	Electronic Ballasts (each)	$12+	2+	--	2+	5.0	175	1.70
F	Setback/Timeclocks for HVAC	$13,968	1,876	135	2,011	4.4	144	2.50
G	Replace Incandescent with Fluorescent Lamps	$321,404	22,993	--	22,993	3.2*	72	3.10
F	Reduce Shower Flow Rates	$125,420	1,788	8,904	10,692	3.2	85	6.00
F	Install Fluorescents in Exit Lights	$79,362	8,167	--	8,167	2.9	103	1.30
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F	Repair HTHW lines	$116,000	1,048	5,937	6,985	2.3	60	8.20
F	High Efficiency Motors (each)	$233+	20+	--	--	1.9	N/A	4.90
G	Install Storm Windows - Family Housing	$1,486,690	11,547	3,404	14,951	1.9*	10	10.00
F	Reduce Stratification Heat Losses	$59,919	25	1,770	1,795	1.9	30	11.30
G	Install Flue Gas Dampers on Oil-Fired Furnaces	$195,899	1,204	--	1,204	1.7*	6	7.10
F	Install Timeclock for Exterior Lights	$30,177	1,374	--	1,374	1.4	46	9.30
F	Replace Incandescents with Fluorescent Lamps	$242,245	10,881	--	10,881	1.3	45	5.60
G	Recover Waste Heat at Laundry Plant	$78,014	767	127	894	1.2*	11	15.40
G	Recirculate Toilet Exhaust Air	$613,968	1,323	3,981	5,304	1.2*	9	15.50
G	Wall Insulation	$710,002	7,372	116	7,488	1.1*	11	17.20
C	Install Solar Hot Water System - Bldg. 405	$67,318	784	--	784	.9*	12	20.00
	TOTALS	$4,281,357	112,594	36,849	149,443		35	

NOTE: Values for the central plant expansion with wood fuel and the refuse fired energy system have not been included in the totals since they are premised on expansion which will occur after FY 1985.

+ Values not included in table totals
** NON-energy SIR

1. 2-40W bulb fixture at 168 hrs/wk use - Replace at failure
2. 168 hrs/wk operation - Replace at failure
3. Values for 25 hp motor at 50 hrs/wk use - Replace at failure

TABLE 6. PROJECTED ENERGY USE AT FORT STEWART

FY	75	79	83	85 STATUS QUO *	BLDG STOCK CHANGE	% GROWTH OVER 75	85 WITH EEAP	EEAP PROJ. CHANGE +	OTHER PROJ. CHANGE ++	% GROWTH OVER 75
ENERGY USE (1000 MBtu)	1159.5	1516.1	2055.2	2091.838	36.6	80.4%	1,594.4	-190.662	-306.782	37.5%
BLDG STOCK (Million S.F.)	6.357	7.364	9.705	10.069	.36	58.4%	10.069	--	--	58.4%
ENERGY USE (KBtu/S.F.)	182.4	205.9	211.8	207.7	100.6	13.9%	158.3	--	--	-13.2%

* Accounts for new and demolished buildings FY83-85
+ Assumes implementation of recommended EEAP projects (Table 3) and does not include renewable fuels (wood).
++ Nonrenewable energy savings for installation initiated projects.

TABLE 7. FORT STEWART CATEGORY DIVISIONS - TYPICAL BUILDINGS

CATEGORY	SUBGROUP	TYPICAL BUILDING	HEATED SQ.FT.	COOLED SQ.FT.	WALL TYPE	ROOF TYPE
OFFICE - A	A-1	13311	151,740	66,573	Concrete	Wood
	A-2	724	413,092	413,092	Concrete/ Brick	Metal
	A-3*	369	308,874	132,799	Wood	Wood
	A-4	725	71,945	71,945	Concrete/ Brick	Metal
	A-5	728	185,362	159,732	Concrete/ Brick	Metal
	SUBTOTAL		1,131,013	844,141		
DINING - B	B-1	13301	228,125	113,309	Concrete	Wood
	B-2	626	42,368	23,664	Concrete/ Brick	Metal
	B-3	726	31,102	31,102	Concrete/ Brick	Metal
	SUBTOTAL		301,595	168,075		
HOUSING - C	C-1	6518	267,419	253,259	Concrete/ Brick	Wood
	C-2	6836	147,050	147,050	Wood	Wood
	C-3	5423	628,604	628,604	Concrete/ Brick	Wood
	C-4	5085	160,535	22,205	Wood	Wood
	C-5	5830	13,220	13,220	Metal	Metal
	C-6	13317	261,620	0	Concrete	Wood
	C-7	4950	50,346	50,346	Concrete/ Brick	Metal
	C-8	623	203,028	203,028	Concrete/ Brick	Reinfor. Concrete
	C-9	718	958,460	958,460	Concrete/ Brick	Reinfor. Concrete
	C-10	6930	513,408	513,408	Concrete/ Brick	Wood
	C-11	7204	1,227,139	1,227,139	Concrete/ Brick	Wood
	SUBTOTAL		4,430,829	4,016,719		

* Building 369 is used to represent two groups of buildings with similar construction but different functions

TABLE 7. FORT STEWART CATEGORY DIVISIONS - TYPICAL BUILDINGS
(continued)

CATEGORY	SUBGROUP	TYPICAL BUILDING	HEATED SQ.FT.	COOLED SQ.FT.	WALL TYPE	ROOF TYPE
WARE-HOUSES - D	D-1	1019, 1079	356,452	69,889	Wood	Wood
	D-2	1012	33,168	25,848	Concrete	Metal
	SUBTOTAL		389,620	95,737		
SHOPS - E	E-1	1069	96,453	71,486	Wood	Wood
	E-2	1820	111,747	0	Concrete/ Brick	Metal
	E-3	1245	102,754	8,555	Concrete/ Brick	Metal
	E-4	1056	108,529	52,719	Wood	Wood
	SUBTOTAL		419,483	132,760		
SERVICE - F	F-1	2125	17,501	13,965	Concrete	Metal
	F-2	402	54,933	54,933	Concrete/ Brick	Reinfor. Concrete
	F-3	708	68,705	14,208	Wood	Metal
	F-4	411	8,800	8,800	Concrete/ Brick	Metal
	F-5	421	201,610	193,329	Concrete/ Brick	Metal
	F-6	410, 703	25,428	25,428	Concrete/ Brick	Metal
	F-7*	369	175,283	73,204	Wood	Wood
	F-8	13306	139,125	45,561		
	SUBTOTAL		691,385	429,428		

* Building 369 is used to represent two groups of buildings with similar construction but different functions

6. RESULTS OF INCREMENT B - DISTRIBUTION SYSTEMS, EMCS

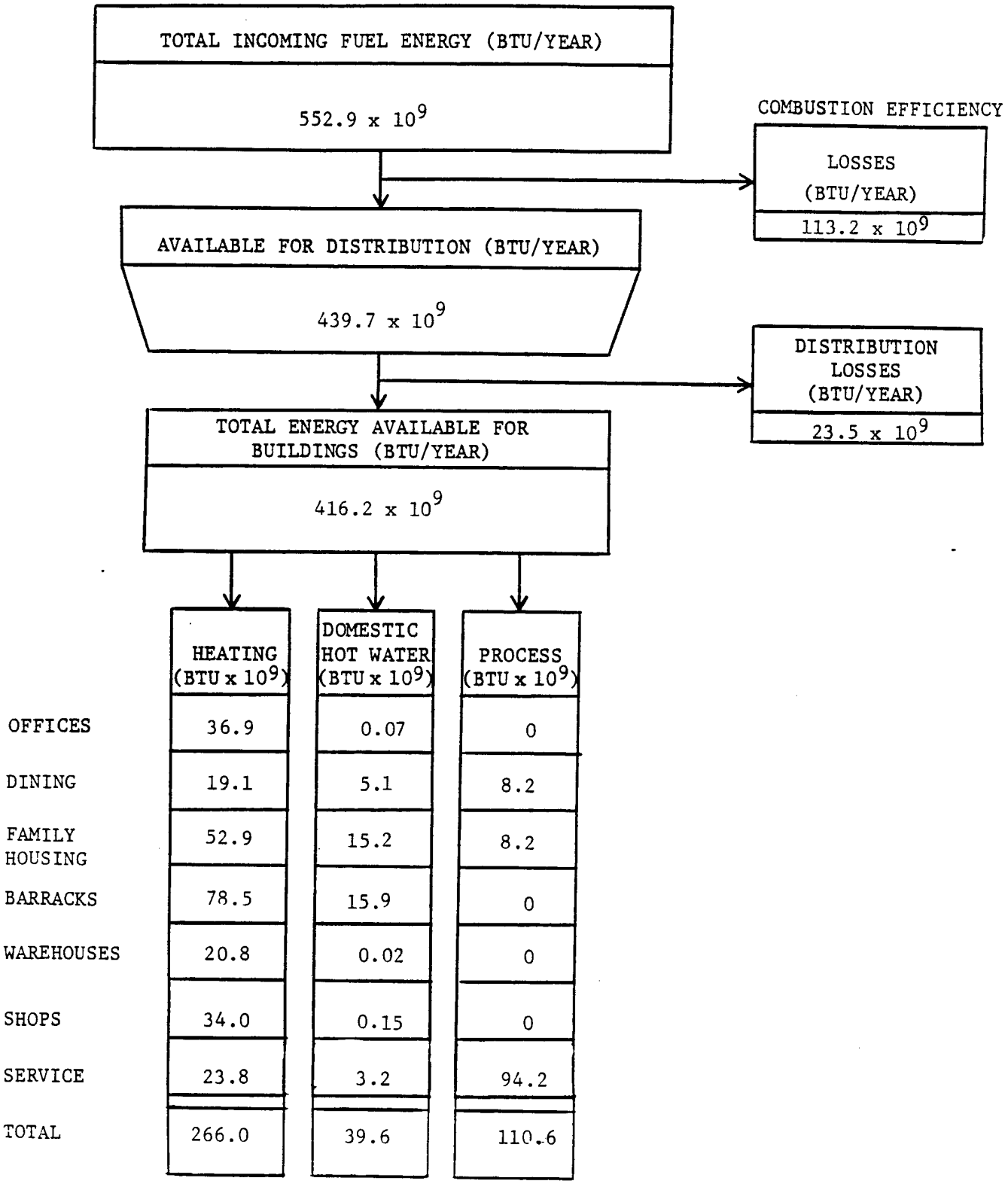
The scope of Increment B involved an engineering analysis of the Post's utilities, energy distribution systems, the existing plants, and the potential for an EMCS. Load profiles for each energy source were performed. The annual energy use profile for fossil fuel and electricity is presented in Figures 5 and 6, respectively. An evaluation was performed for Fort Stewart for a distributed intelligence EMCS to allow programmed start/stop, supervision, fault detection, and control reset of building mechanical systems. The use of a VHF-FM control system was analyzed to perform cycling of residential air conditioning units and electric hot water heated and shutdown and setback of selected building HVAC units and warm air furnaces. As the result of these evaluations, an ECIP project was initially recommended. A revision of this project was accomplished in which all temporary buildings were deleted from the analysis. As a result of this revision, the project no longer met ECIP criteria and is not recommended.

7. RESULTS OF INCREMENT C - RENEWABLE ENERGY

The Increment C study at Fort Stewart was an analysis of both passive and active solar applications on Post. A life cycle cost analysis was performed to determine the most economical system for solar application. This study showed that one building, the Officers Club #405, qualified for solar hot water under the Total Energy Selection Life Cycle Cost Criteria (ETL 1110-3-302). The solar system for the Officers Club has a 12 year payback with savings of 784 MBtu annually.

8. RESULTS OF INCREMENT D - SOLID WASTE AS FUEL

The scope of work for Increment D required the analysis and study of two potential sources for energy recovery from waste: refuse collected on Fort Stewart; and refuse collected in the area adjacent to the Post. Refuse availability was studied for both Fort Stewart and Fort Hunter, as well as adjacent areas. These evaluations led to the recommendation of four-25 ton per hour modular incineration systems. Economics for this project shows an SIR of 37, with a 2 year payback period.



	HEATING (BTU x 10^9)	DOMESTIC HOT WATER (BTU x 10^9)	PROCESS (BTU x 10^9)
OFFICES	36.9	0.07	0
DINING	19.1	5.1	8.2
FAMILY HOUSING	52.9	15.2	8.2
BARRACKS	78.5	15.9	0
WAREHOUSES	20.8	0.02	0
SHOPS	34.0	0.15	0
SERVICE	23.8	3.2	94.2
TOTAL	266.0	39.6	110.6

FIGURE 5. FOSSIL FUEL ENERGY PROFILE BY 1979
SOURCE: Appendix C, Increment A

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9. RESULTS OF INCREMENT E - CENTRAL ENERGY PLANT

The scope of work for Increment E required a feasibility assessment at installing central energy plants serving all or discrete parts of Fort Stewart. Since a central wood plant was under construction at the time of the study, the emphasis was placed on expanding this plant using wood as fuel. This evaluation recommended the new plant be further expanded, which would result in a total savings of 168,776 MBtu and $760,000 per year.

10. RESULTS OF INCREMENT F - FACILITY ENGINEER CONSERVATION MEASURES

The scope of work under Increment F is the identification of energy conservation opportunities that are within the Facilities Engineer funding authority, or which satisfy QRIP, OSD PIF, or PECIP requirements. In the performance of the Increment F evaluation, 62 buildings on Post were evaluated and 15 infiltration tests were performed.

Another element of the Increment F report is to identify the energy conservation measures accomplished by the Post since 1975. Table 8 lists these projects. Also addressed are the planned facility changes and their impact on energy use. These are shown in Table 9. The recommended Increment F projects are presented in Table 10.

11. RESULTS OF INCREMENT G - MINOR CONSTRUCTION PROJECTS AND CHANGES IN OPERATION AND MAINTENANCE

The scope of work for Increment G was to identify cost-effective energy saving projects which do not qualify for ECIP funding. Increment G work was performed in conjunction with Increments A and B. The recommended projects are listed in Table 5.

12. ENERGY PLAN

A summary of the impact of JRB recommended energy conservation projects and future Post actions on annual energy use is presented in Table 6. The estimated annual energy use at Fort Stewart, after implementation of all recommended energy conservation projects is estimated at 37.5 percent above FY 1975 use, although square footage will increase 58.4%. If recommended

TABLE 8. PROJECTS ACCOMPLISHED BY THE POST SINCE 1975 WITH ESTABLISHED ENERGY SAVINGS

Project	Annual Energy Savings (MBtu)
Insulate and weatherstrip administration buildings implemented prior to FY 83*	37,000
Central Plant conversion to wood fuel	294,600
Convert furnaces to heat pumps in family housing	12,182
TOTAL	343,782

TABLE 9. FACILITY BUILDING STOCK CHANGES AT FORT STEWART

FY	*	BUILDING TYPE	BLDG. NO.	CHANGE (SF)	BUILDING ENERGY USE (Btu/SF)	(MBtu)	TYPICAL BUILDING #	TYPE
83	N	Co Admin/Supply	227	4,838	166,396	805.0	724	Co Admin/Supply
	N	Co Admin/Supply	242	4,769	166,396	793.5	724	Co Admin/Supply
	N	TAC Equip Shop	228	3,610	124,432	449.2	1245	TAC Equip Shop
	N	TAC Equip Shop	245	2,382	124,432	296.4	1245	TAC Equip Shop
	N	Warehouse	233	8,700	73,489	639.4	1012	Warehouse
	N	Warehouse	898	2,000	73,489	147.0	1012	Warehouse
		SUBTOTAL		16,692		1,532		
84	N	Vanguard Fac.	256	3,650	124,432	454	1245	Maint. Shop
	N	Co Admin/Supply	265	4,834	166,396	804	724	Co Admin/Supply
	N	BN HQ/Classrooms	239	14,831	161,683	2,398	725	BN HQ/Classrooms
	N	E.M. Club	311	25,200	243,356	6,133	405	Officers Club
	N	244 Fam. Hsg. Units	--	317,200	95,505	30,294	7204	Fam. Hsg. Units
		SUBTOTAL		365,715		40,083		
85	D	Classroom	329	-4,286	271,276	-1,163	728	Admin.
	D	Classroom	330	-4,570	271,276	-1,240	728	Admin.
	D	Classroom	331	-4,755	271,276	-1,290	728	Admin.
	D	Classroom	332	-4,737	271,276	-1,285	728	Admin.
		SUBTOTAL		-18,348		-4,977		
		TOTAL		364,059		36,638		

* N = New construction
  D = Demolished

SOURCE: MCA construction plans; Energy use based upon comparable existing building use.

TABLE 10. ENERGY CONSERVATION PROJECTS EVALUATED AT FORT STEWART UNDER INCREMENT F

NO.	PROJECT	PROJECT COST	----ENERGY SAVED---- NONRENEW (MBtu)	RENEWABLE+ (MBtu)	NONRENEWABLE FUEL TYPE	ANNUAL COST SAVINGS	SIR	LABOR (HRS)	SIMPLE PAYBACK
1	Reduce DHW temperatures	$25,983	28,646	7,772	ALL	$108,055	49.6	1,144	<1
2	Convert to central plant heat	$19,012	2,083	-2,478	OIL	$10,886	11.5	127	1.7
3	Insulate high temp. hot water pipe	$2,515	91	378	OIL	$1,051	7.9	32	2.4
4	Energy conserving flourescent lamps (each)	$1.2*	.15*	--	ELEC	.67*	5.5**	0*	1.8
5	Electronic ballasts (each)	$12*	2.1*	--	ELEC	$7*	5.0	0*	1.7
6	Setback/timeclocks for HVAC	$13,968	1,876	135	ALL	$5,615	4.4	99	2.5
7	Shower flow restrictors	$125,420	1,788	8904	OIL, ELEC	$21,034	3.2	1,512	6.0
8	Install fluorescents in exit light	$79,362	8,167	--	ELEC	$51,642	2.9	439	1.5
9	Reduce infiltration - BOQs	$4,950	108	--	NG	$554	2.7	45	8.9
10	Heat recovery from A/C	$13,026	266	--	ALL	$1,879	2.5	161	6.9
11	Repair HTHW lines	$1,103	10	58	OIL	$134	2.3	9	8.2
12	Reduce stratification heat losses	$59,919	25	1770	ALL	$5,289	1.9	930	11.3
13	High efficiency motors	$233*	20*	--	ELEC	$48*	1.9	4*	4.9
14	Recovery heat from waste oil	$139,557	8,482	--	OIL	$2,972	1.5	860	>20
15	Exterior lighting control	$30,177	1,374	--	ELEC	$3,256	1.4	754	9.3
16	Replace inc. with fluor.	$242,245	10,881	--	ELEC	$43,443	1.3**	649	5.6
	TOTAL	$757,237	63,797	16,539		$255,810		6,761	

* Values not included in table totals
** NON-energy SIR
\+ Wood fuel used in central HTHW plant

1. 2-40W bulb fixture at 168 hrs/wk use - Replace at failure
2. 168 hrs/wk operation - Replace at failure
3. Values for 25 hp motor at 50 hrs/wk use - Replace at failure

projects are not implemented, energy use is estimated to increase 80.4 percent. A comparison of annual energy use per square foot of Fort Stewart floor area is shown in Table 6.

13. RESULTS AND RECOMMENDATIONS

The energy use at Fort Stewart has increased since 1975 due to the major building program that has been underway during this period. It is doubtful that the 1975 levels can ever be achieved. However, there are several actions that can be taken to maintain or improve the status quo. They are:

- Maintain the current energy program at Post level;
- Continue to program and fund energy programs;
- Pursue the expansion of a central energy plant at Fort Stewart using wood as renewable fuel source;
- Consider cogeneration in any proposed expansion to the central energy plant; and
- Place priority on the proposed EMCS project for energy control at Fort Stewart to include proper operator training and control repair/ maintenance.